



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re the Application of:

Gustavo DECO et al.

Serial No. 09/530,983

Group Art Unit: 3762

Confirmation No. 5072

Filed: May 8, 2000

Examiner: OROPEZA, FRANCES P

For: ARRANGEMENT FOR PREDICTING AN ABNORMALITY OF A SYSTEM AND FOR  
IMPLEMENTING AN ACTION OPPOSING THE ABNORMALITY

**APPEAL REINSTATEMENT REQUEST AND**

**SUPPLEMENTAL APPEAL BRIEF UNDER 37 C.F.R §1.193(b)(2)**

Commissioner for Patents  
PO Box 1450  
Alexandria, VA 22313-1450

Sir:

Pursuant to the Appellant's Notice of Appeal, filed on July 19, 2004, Appellant's Appeal Brief, filed July 28, 2004, and the Examiner's reopening of prosecution in the Office Action mailed August 19, 2004, Appellant hereby requests reinstatement of the Appeal to the Board of Patent Appeals and Interferences.

This Supplemental Appeal Brief is also respectfully submitted, briefly discussing the additional arguments presented by the Examiner in the Office Action mailed August 19, 2004. As the response due date for the Office Action was November 19, 2004, a petition for a two-month extension of time has been concurrently filed herewith.

In conformance with requirements set forth in 37 CFR §1.192(c), the Appeal Brief filed July 28, 2004 is incorporated herein by reference.

Appellant submits this Supplemental Appeal Brief in triplicate.

## I. Status of Claims

Pursuant to 37 C.F.R. §1.192(c)(3), claims 1-18 are pending in this application at the filing of this Appeal Brief. Claims 1-18 stand finally rejected. Claims 1, 16, 17 and 18 are independent claims, and claims 2-15 are dependent claims.

Claims 1-18 presently stand rejected under 35 USC § 112, first paragraph, claims 1-3, 10, and 16-18 stand rejected under 35 USC § 102(e), and claims 4-9 and 11-15 stand rejected under 35 USC § 103(a). Prior to the recently issued Office Action of August 19, 2004, claims 1-3, 10 and 16-18 stood rejected under 35 USC § 103(a) under a combination of two references, including the present primary reference, with claims 4-9 and 11-15 being rejected under 35 USC § 103(a) based on a further combination of the two references and a third reference.

The outstanding Supplemental Appeal Brief addresses the new rejections presented by the Examiner in the August 19, 2004, Office Action.

## II. Summary of the Invention

Pursuant to 37 C.F.R. §1.192(c)(5), embodiments of the present invention are directed toward apparatuses and methods including predicting an abnormality of a dynamic system and implementing an action based on the predicted abnormality using a "continuous information flow that describes a development of a predictability of several future system states," for example.

A summary of the invention will now be described with reference to independent claim 1 and some supporting portions of the specification.

The "continuous information flow" is to be understood as a development of a predictability of plural future states, as supported by the specification, the previous traversals, and the state of the art. The use of "continuous information flow" is synonymous with the basic term "information flow." See the background of the present application which similarly defines "information flow" as a "a loss of information in a dynamic system and describes decaying statistical dependencies between the entire past and a point in time that lies p steps in the future as a function of p," i.e., as information flow is dealing with the entire past and points of time in the future the 'information flow' is continuous.

As a further example, and as the Examiner has asked explanation of the same, the independent claims (except for claim 18) only refer to the "continuous information flow" in their preambles, while claim 18 first refers to a continuous information flow and from thereafter refers to the same as "the information flow." Thus, the use of "continuous information flow" means the

same as an "information flow."

As previously explained, embodiments of the present invention include the utilization of neural networks to determine a comparison information flow describing a comparison dynamic of a system.

By way of only an example, in claim 1, a neural network is trained with comparison measured data. This means that time series measured values of numerous healthy patients are supplied to the neural network. An example of this is detailed in the specification at paragraph [0009] under section (1). Further exemplary discussions can be found in paragraphs [0019] and [0024]. Paragraph [0027] explains that the neural network is trained with EKG measurement data in its training phase, for example. This means specifically that the neural network is trained with measured data of healthy patients, for example.

In the next operation of the claim 1, the "comparison information flow" is determined, in that the neural network evaluates the comparison measured data. The comparison information flow here represents a kind of average that is to be evaluated with healthy patients, and so a healthy functional state of a heart or a brain is to be expected, for example.

This is not a simple average value but an "information flow" that is concerned here, as was already specifically discussed.

The trained neural network thus prepares a measure, based on the comparison measured data with the comparison information flow, which represents the manner of functioning of a healthy heart or a healthy brain. Comparison with this measure makes possible conclusions as to the presence of an abnormality. Support for this can be found in the specification in paragraph [0009] under section (2). Paragraph [0011] further describes, under section 1, the extraction of the comparison information flow from the comparison measured data. With the comparison information flow, there is concerned the dynamically characterizing features of the system, which are extracted and adaptively learned (trained). The learned normal condition is described here by the comparison information flow.

According to the next feature of claim 1, "a test information flow" is determined from the test measured data. With the test measured data, found data relates to a patient in whom a disturbed state is to be expected.

It is evident to one skilled in the requisite art that in the context of the presently claimed invention, as well as described in the specification as a whole, namely the immediate prevention of an epileptic occurrence or a disturbance of the heart, test measured data must mean already

known corresponding identifying data of a similar situated patient.

The test measured data are finally compared with collected data of healthy patients or healthy functional states, i.e., the comparison measured data. For this purpose, however, a test information flow is also determined from the test measured data. The test information flow is thus determined as a measure of the present functional state of the patient or his abnormality. See paragraphs [0011], section 2, among others.

The test information flow, or its deviation from the comparison information flow, can be considered here as variables (prediction quantities). That the abnormality can be determined by a consideration of the information flow (as a dynamic characterizing feature of the system) is supported by paragraph [0011], section 1. Furthermore, the circumstance under which an abnormality can be concluded from a deviation of the test information flow from the comparison information flow is supported by paragraphs [0013] and [0015].

In addition, support for how a change of the test information flow compared to the comparison information flow can result in a conclusion that an abnormality is present can also found in paragraphs [0027], [0028], [0029] and [0030].

Further to above, and further to the remaining independent claims, different embodiments of the present invention detail different operations that are performed when the existence of an abnormality is established, e.g., exciting the underlying system with a chaotic signal, noise, or a regular signal with an electric or magnetic field. The establishment of the abnormality may further be based on whether the test information is significantly greater or smaller than the comparison information flow.

The application further provides two examples of the present invention being implemented in the health field, e.g., preventing epilepsy seizures by the predicting of an abnormality in a person's brain and applying a signal to the brain to prevent the occurrence of the seizure. See the present application on in paragraphs [0026] through [0042] for examples.

### III. Office Action issued August 19, 2004

The outstanding Office Action has reopened prosecution from the previously filed Appeal Brief to set forth § 112, first paragraph, rejections of claims 1-18 and readjust the underlying interpretation of the primary reference Ravdin et al., U.S. Patent No. 5,862,304, to read on pending claims 1-3, 10, and 16-18, while the previous Office Action had interpreted Ravdin et al.

to "disclose the claimed invention except for the information flow describing a development of a predictability of plural future system states," and which the Examiner presently proffers is either performed by Ravdin et al. or only an intended use phrase that shouldn't be given patent able weight.

In view of the § 112, first paragraph, rejections of the claims where the Examiner pointed out that the primary claim terms "information flow," "comparison information flow," or "test information flow" were not understood by the Examiner, since the Examiner could not find support for the same in the specification, it would appear that the present interpretations of Ravdin et al. to disclose the presently claimed invention are equally mistaken.

The following remarks will address the new rejections, noting that the previous Appeal Brief remarks are equally applicable, and incorporated herein by reference.

#### IV. Supplemental Issues

1. Whether claims 1-18 are enabled by the present specification.
2. Whether independent claim 1, dependent claims 2-3 and 10, and independent claims 16-18 are patentably distinct over Ravdin et al.
2. Whether dependent claims 4-9 and 11-15 are patentably distinct over the combination of Ravdin et al. in view of Abrams et al., U.S. Patent No. 6,117,066.

#### V. Supplemental Grouping of Claims

Pursuant to 37 C.F.R. §1.192(c)(7), the claims are grouped as follows:

1. Independent claims 1 and 16, and dependent claim 2, stand and fall together;
2. Independent claim 17 stands and falls alone.
3. Independent claim 18 stands and falls alone.
4. Dependent claims 3 and 10 stand and fall together;
5. Dependent claims 4-9 and 11-15 stand and fall together.

## VI. Supplemental Argument

### 1. Claims 1-18 are enabled by the present specification.

As noted above, the outstanding Office Action has set forth a rejection of claims 1-18 as not being enabled by the present specification. In particular, the Examiner would appear to misunderstand the term "information flow" or the correspondingly claimed comparison and test information flows. The above discussion in the Summary of the Invention is accordingly incorporated herein, detailing portions of the present specification evidencing, including examples, the claimed invention, including the claimed information flows.

In addition, it is noted that the Office Action has further indicated that "the details of the components and methods associated with the arrangement and method of predicting an abnormality of a dynamic system and for implementing an action opposing the abnormality/using a continuous information flow that describe a development of a predictability of several future system states are not found in the specification. The specification does not describe how the apparatus and system train the neural network, determine comparison information flow, determine test information flow, use the comparison information flow and the test information flow to predict an abnormality, nor how an action/procedure is implemented."

However, it is not necessary that the application describe the claim limitations exactly, but only so clearly that persons of ordinary skill in the art will recognize from the disclosure that appellants invented processes including those limitations. In re Wertheim, 191 USPQ 90, 96 (CCPA 1976). Similarly, "[the specification] need only be reasonable with respect to the art involved; they need not inform the layman nor disclose what the skilled already posses. They need not describe the conventional...The intricacies need not be detailed ad absurdum." General Electric Co. v. Brenner, 159 USPQ 335 (D.C. Cir. 1968). In addition, a defining aspect of enablement is that there isn't undue experimentation, i.e., experiment required to reproduce the claimed features is satisfactory, as long as it isn't undue experimentation. In re Geerdes, 180 USPQ 789, 793 (CCPA 1974).

Accordingly, after review of the present invention and disclosure, it is respectfully submitted that one of ordinary skill in the art would have understood the presently claimed invention and been able to implement the same.

Again, it is noted that an amount of experiment required to reproduce the claimed features is acceptable, as long as it isn't undue experimentation.

In addition, as noted in MPEP § 2163.04, a "description as filed is presumed to be adequate, unless or until sufficient evidence or reasoning to the contrary has been presented by the examiner to rebut the presumption." The Examiner, therefore, must have a reasonable basis to challenge the adequacy of the written description. The Examiner has the initial burden or presenting by the a preponderance of evidence why a person skilled in the art would not recognize in an applicant's disclosure a description of the invention as defined by the claims.

MPEP § 2163.04(I) further details that in rejecting a claim, "the examiner must set forth express findings of fact which support the lack of written description." As further detailed, "[t]hese findings should: (a) Identify the claim limitation at issue; and (B) Establish a prima facie case by providing reasons why a person skilled in the art at the time the application was filed would not have recognized that the inventor was in possession of the invention as filed. A general allegation of 'unpredictability in the art' is not a sufficient reason to support a rejection for lack of adequate written description."

Further see MPEP § 2163.04(II), where the Examiner is required to "consider the record as a whole, including amendments, arguments, and any evidence submitted by applicant," before reissuing a § 112 description rejection.

It is respectfully submitted that the outstanding § 112, first paragraph, rejection fails to meet these primary standards.

Regarding enablement, again the issue falls on whether the application provides enough disclosure to enable one skilled in the art to make and use the claimed invention. "The standard for determining whether the specification meets the enablement requirement [is whether the] experimentation needed to practice the invention [is] undue or unreasonable." See MPEP § 2164.01.

Again, the Examiner has "the initial burden to establish a reasonable basis to question the enablement provided for the claimed invention....[the] examiner must provide a reasonable explanation as to why the scope of protection provided by the claim is not adequately enabled by the disclosure." MPEP § 2164.04.

Further, "[a] specification disclosure which contains a teaching of the manner and process of making and using an invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented must be taken as being in compliance with the enablement requirement....unless there is a reason to doubt the objective

truth of the statements contained therein which must be relied upon for enabling support." Id.

Thus, it is respectfully submitted that applicants have met the enablement requirements for one of ordinary skill in the art, i.e., one of ordinary skill in this art and with the requisite level of skill. In addition, it is respectfully submitted that the Examiner has failed to meet the initial burden supporting the § 112 enablement rejection, as the Examiner has failed to present any reasonable explanation why the claimed features are not enabled by the specification or why implementation of the invention would have required undue experimentation by one of similar skill in the art at the requisite level of skill.

Lastly, it is noted that the Examiner has inferred that the aforementioned claim terms are described only in documents provided by the applicant, and referenced in the background of the present application. However, upon a review of these documents, it can be noticed that these documents merely reinforce the fact that applicant was the inventor and originator of the claimed "information flow," with the same term and definition (as in the present specification) being repeated in the same documents. The information in these documents is not necessary for one of ordinary skill in requisite art to understand the present invention, or implement the same, i.e., there would not have been any required undue experimentation of one skilled in the requisite art.

Therefore, it is respectfully submitted that claims 1-18 are enabled by the specification, as a whole.

2. Independent claims 1 and 16-18 are patentably distinct over Ravdin et al.

As an example, independent claim 18 sets forth:

"[a] method for predicting an abnormality of a dynamic system and for implementing a procedure in response to the abnormality, comprising:

- training a neural network to learn the dynamics of a system;
- evaluating a continuous information flow received from the system;
- predicting an abnormality when the information flow differs significantly from normal state information as determined by the neural network; and
- implementing a procedure, if an abnormality is predicted, to prevent or treat the abnormality,

wherein the information flow describes a development of a predictability of plural future system states."

Thus, independent claim 18 at least details the use of a neural network to learn the



dynamics of a system and comparing an evaluated "information flow" with normal state information determined by the neural network. The remaining independent claims will be discussed more specifically below, as each independent claims includes additional limitations further defining the claimed invention.

The Examiner has argued that Ravdin et al. discloses all the claimed features of the independent claims.

In particular, the Examiner has taken the position that, in Ravdin et al., "the data processing by the neural network entails successive data iterations, read to be using a continuous information flow, to make successful predictions of patients relapse....It is noted the limitation of information flow describing a development of a predictability of plural future system states is an intended use limitation that Ravdin et al. performs or is capable of performing." See page 4 of the Office Action. The Office Action continues to briefly describe how Ravdin et al. evaluates multiple parameters to determine future disease states and the resultant exact prediction of the future states being dependent on the values of the particular parameters and the time or point in future that is examined.

Thus, the Office Action has changed the particular definition of "information flow" set forth in the present specification, and reiterated in the independent claims, to read only using multiple parameters to determine future disease states, with the resultant "exact prediction of the future states being dependent on the values of the particular parameters and the time or point in future that is examined."

Contrary to the Examiner's definition of information flow, the present application particularly defines the same as "(a) a loss of information in (b) a dynamic system and describes (c) decaying statistical dependencies (d) between the entire past and (d) a point in time that lies p steps in the future as a function of p" and (e) a development of a predictability of several future system states.

These particular terms (a) – (e) are not described in the specification as "intended uses" or as preferred embodiments, but as the definition of an "information flow."

Thus, the Examiner's interpretation of information flow completely disregards the particular definition set forth in the specification.

It is briefly noted that the Office Action references Ravdin et al., in column 9, lines 49-52, in support of the disclosure of the claimed information flow, though portion of Ravdin et al. is

unrelated to the claimed information flow. This portion of Ravdin et al. describes "learning iterations" of a neural network. This discussion is completely different from a description of a development of a predictability of plural future states, as recited in the independent claims.

Thus, Ravdin et al. fails to disclose at least the claimed information flow as being the development of a predictability of plural future system states, or as meeting the aforementioned definition of information flow.

In addition, among other features, it is noted that independent claims 1, 16 and 17 detail the requirement of the comparison information flow, determining a test information flow, and using that test information flow to determine the establishment of an abnormality being predicted. None of these "information flows" are disclosed or suggested in Ravdin et al.

Therefore, it is respectfully submitted that independent claims 1 and 16-18 are patentably distinct from Ravdin et al.

In addition, it is respectfully submitted that dependent claims 2-3 and 10 are equally not disclosed by Ravdin et al., as Ravdin et al. at least fails to disclose the claimed comparison and test information flows.

3. Dependent claims 4-9 and 11-15 are patentably distinct over the combination of

The outstanding rejection of claims 4-9 and 11-15 would appear to be identical, except for the lack of one of the previously relied upon references, to the previous rejections of claims 4-9 and 11-15 traversed in the Appeal Brief filed July 28, 2004. Accordingly, the same is equally applicable to the outstanding rejection, and incorporated herein.

Therefore, in addition to the above discussion regarding the independent claims, and the previous remarks presented in the July 28, 2004 Appeal Brief, it is respectfully submitted that claims 4-9 and 11-15 are patentably distinct from Ravdin et al. and Abrams et al., alone or in combination.

## VII. Conclusion

In view of the law and facts stated herein, the Appellant respectfully submits that the Examiner has failed set forth a prima facie non-enablement, anticipatory, and obviousness cases against the pending claims.

For all the foregoing reasons, the Appellant respectfully submits that the cited prior art does not teach or suggest the presently claimed invention. The claims are patentable over the prior art of record and the Examiner's findings of unpatentability and non-enablement regarding claims 1-18 should be reversed and the patentability over the presently cited references be affirmed.

The Commissioner is hereby authorized to charge any additional fees required in connection with the filing of the previous Appeal Brief and the outstanding Supplemental Appeal Brief to our Deposit Account No. 19-3935.

Respectfully submitted,

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Dated: 1/19/05

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